

Claims

35/102 Heavy & Rodney
 47/70, 74, 181
 701/convertible or 50's-60's
 switchable
 betw. manual
 & automatic
 74/338, 325, 335, 346
 192/87.15, 87.18
 3.58 10
 "after market"
 modify exist
 15 20
 multiple dep claim
 25 in
 dep. claim
 30
 74.45
 68.01 (in)
 a mult. dep.
 claim may not
 serve as basis
 for another
 mult. dep. claim
 due to order.

1. A gear box adaptor including: a hub adapted to be engageable with a gear shaft for rotation therewith; at least one piston mounted within said hub; means for supplying fluid from the exterior of the hub to a first face of the or each said piston, so as to move said piston in a first direction; at least one clutch means adjacent the or each said piston, part of the or each said clutch means being engaged with said hub and a different part of the or each said clutch means being engageable with a gear locatable on said gear shaft adjacent said hub; the or each said clutch means being located and arranged such that movement of said piston in said first direction inter-engages said parts of said clutch to drivingly engage said gear and said gear shaft.

2. The adaptor as claimed in claim 1 wherein said hub, the or each said piston and the or each said clutch means all are concentric and said hub is adapted to be concentrically engageable with said gear shaft.

3. The adaptor as claimed in claim 2 wherein the or each said piston and the or each said clutch means both are annular.

4. The adaptor as claimed in claim 2 or claim 3 wherein the or each said clutch means comprises a clutch pack which consists of a first series of spaced plates each of which is engaged with the hub for rotation therewith but which is reciprocable parallel to the longitudinal axis of said hub; and a second series of spaced plates each of which is engageable with a gear mounted upon said gear shaft but which is reciprocable parallel to the longitudinal axis of said hub; said second series of plates being interleaved with the plates of said first series.

5. The adaptor as claimed in any one claims 2-4 wherein the or each said clutch means and the or each said piston are mounted in a recess in said hub.

6. The adaptor as claimed in claim 5 further comprising a casing surrounding at least part of the exterior of said hub, said casing being mounted upon said hub but not rotatable therewith; at least one first fluid passage being formed between the interior of the casing and the exterior of the hub, the or each said first fluid passage being in communication with said means for supplying fluid to a first face of the or each said piston, which comprises at least one second fluid passage formed through said hub.

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The adaptor as claimed in any one of claims 1-4 incorporating two said pistons and two said clutch means, the first piston and the corresponding first clutch means being mounted in a first recess formed in one end of the hub, and the second piston and the corresponding second clutch means being mounted in a second recess formed in the other end of the hub; wherein part of the first clutch means is engageable with a first gear and part of the second clutch means is engageable with a second gear.

8. The adaptor as claimed in claim 7 further comprising a casing surrounding at least part of the exterior of said hub, said casing being mounted upon said hub but not rotatable therewith; two separate first fluid passages being formed between the interior of the casing and the exterior of the hub, each said first fluid passage being in communication with the corresponding said means for supplying fluid to a first face of said corresponding piston, which comprises a second fluid passage formed through said hub.
9. The adaptor as claimed in any one of the preceding claims wherein said fluid is hydraulic fluid.
10. The adaptor as claimed in any one of the preceding claims where said fluid is pneumatic fluid.
11. A sequential gearbox as hereinbefore defined, including a standard gearbox from which the synchro-hubs and cones have been removed and a gearbox adaptor as claimed in any one of claims 1-6 has been fitted to each gear, with part of each hub mounted on the gear shaft and each clutch means engaged with the corresponding gear.
12. A sequential gearbox as hereinbefore defined, including a standard gearbox from which the synchro-hubs and cones have been removed and a gearbox adaptor as claimed in claim 7 or claim 8 has been fitted between each pair of adjacent gears, with each hub mounted on the gear shaft between said two adjacent gears and part of one clutch means engaged with one of said gears and part of the other clutch means engaged with the other of said gears.
13. A sequential gearbox as claimed in claim 11 or claim 12, further including electronic control means which comprises two micro-switches which are connected via a sequencing arrangement to a set of solenoid valves, one solenoid valve being connected to the means for supplying fluid to each piston

such that fluid is supplied to said piston when said solenoid valve is open and fluid is withdrawn from said piston when said solenoid valve is closed; the control means being such that each time the first micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined first sequence; and each time the second micro-switch is closed, the sequencing arrangement closes any solenoid valve which is open and opens the next solenoid valve in a predetermined second sequence.

14. The sequential gearbox as claimed in claim 13, wherein said predetermined second sequence is the reverse of said predetermined first sequence.